What is claimed is:

1. An RF module comprising:

a waveguide in which a half-wavelength TE mode resonator is formed;

at least one E plane coupling window formed in a wall portion orthogonal to an H plane out of wall portions constructing the TE mode resonator in the waveguide;

one output line provided at the edge on the side of one of the wall portions parallel with the H plane in the one E plane coupling window, and magnetically coupled to electromagnetic waves in the TE mode resonator; and

another output line provided at the edge on the side of the other wall portion parallel with the H plane in the one E plane coupling window or another E plane coupling window, and magnetically coupled to the electromagnetic waves.

2. The RF module according to claim 1, wherein only one E plane coupling window is provided as the E plane coupling window,

the one output line is provided at the edge on the side of the one wall portion parallel with the H plane in the one E plane coupling window, and magnetically coupled to electromagnetic waves in the TE mode resonator; and

the another output line is provided at the edge on the side of the other wall portion parallel with the H plane in the one E plane coupling window, and magnetically coupled to the electromagnetic waves.

3. The RF module according to claim 1, wherein two E plane coupling windows formed in a single wall portion orthogonal to an H plane out of wall portions constructing the TE mode resonator are provided as the E plane coupling window,

the one output line provided at the edge on the side of one of the wall portions parallel with the H plane in one of the two E plane coupling windows, and magnetically coupled to electromagnetic waves in the TE mode resonator, and

the another output line is provided at the edge on the side of the other wall portion parallel with the H plane in the other E plane coupling window out of the two coupling windows and magnetically coupled to the electromagnetic waves.

4. The RF module according to claim 1, wherein a pair of E plane coupling windows formed in a pair of wall portions which are orthogonal to an H plane out of wall portions constructing the TE mode resonator and which are different from each other are provided as the E plane coupling window,

the one output line is provided at the edge on the side of the one

wall portion parallel with the H plane in one of the pair of E plane coupling windows, and magnetically coupled to electromagnetic waves in the TE mode resonator, and

the another output line is provided at the edge on the side of the other wall portion in parallel with the H plane in the other E plane coupling window out of the pair of E plane coupling windows, and magnetically coupled to the electromagnetic waves.

5. The RF module according to claim 1, wherein the waveguide comprises a pair of ground electrodes provided so as to face each other and a conductor for making the pair of ground electrodes conductive.

6. The RF module according to claim 1, further comprising an input line capable of supplying electromagnetic waves in the TEM mode as electromagnetic waves in the TE mode to the waveguide.

7. The RF module according to claim 6, further comprising at least one resonator between the input line and the half-wavelength TE mode resonator.

8. An RF module comprising:

a waveguide in which a half-wavelength TE mode resonator is formed;

at least one H plane coupling window formed in a wall portion parallel with an H plane out of wall portions constructing the TE mode resonator in the waveguide;

one output line provided at either the edge on the center side or the edge on the outer periphery side of the TE mode resonator in the one H plane coupling window, and magnetically coupled to electromagnetic waves in the TE mode resonator; and

another output line provided at either the edge on the center side or the edge on the outer periphery side of the TE mode resonator at the edge of either the one H plane coupling window or another H plane coupling window and magnetically coupled to the electromagnetic waves.

9. The RF module according to claim 8, wherein only one H plane coupling window is provided as the H plane coupling window,

the one output line is provided at the edge on the center side of the TE mode resonator in the one H plane coupling window and magnetically coupled to electromagnetic waves in the TE mode resonator, and

the another output line is provided at the edge on the outer periphery side of the TE mode resonator at the edge of the one H plane coupling window and magnetically coupled to the electromagnetic waves.

10. The RF module according to claim 8, wherein two H plane coupling windows formed in one wall portion parallel with an H plane out of wall

portions constructing the TE mode resonator are provided as the H plane coupling window,

the one output line is provided at the edge on the center side of the TE mode resonator in one of the two H plane coupling windows and magnetically coupled to electromagnetic waves in the TE mode resonator, and

the another output line is provided at the edge on the side of the outer periphery of the TE mode resonator at the edge of the other of the two H plane coupling windows, and magnetically coupled to the electromagnetic waves.

11. The RF module according to claim 8, wherein two H plane coupling windows formed in two wall portions parallel with an H plane in wall portions constructing the TE mode resonator are provided as the H plane coupling window,

the one output line is provided at either the edge on the center side or the edge on the side of the outer periphery of the TE mode resonator in one of the two H plane coupling windows, and magnetically coupled to electromagnetic waves in the TE mode resonator, and

the another output line is provided at the edge in the other of the two H plane coupling windows, which is the edge on the same side as the edge at which the one output line is provided in one of the H plane coupling windows, and magnetically coupled to the electromagnetic waves.

12. The RF module according to claim 8, wherein the waveguide comprises a pair of ground electrodes provided so as to face each other and a conductor for making the pair of ground electrodes conductive.

13. The RF module according to claim 8, further comprising an input line capable of supplying electromagnetic waves in the TEM mode as electromagnetic waves in the TE mode to the waveguide.

14. The RF module according to claim 13, further comprising at least one resonator between the input line and the half-wavelength TE mode resonator.

15. An RF module comprising:

a waveguide in which a half-wavelength TE mode resonator is formed;

an E plane coupling window formed in a wall portion orthogonal to an H plane out of wall portions constructing the TE mode resonator in the waveguide;

an H plane coupling window formed in one of wall portions parallel with the H plane in the wall portions;

one output line provided at the edge on the side of the wall portion in which the H plane coupling window is formed in the E plane coupling

window, and magnetically coupled to electromagnetic waves in the TE mode resonator; and

another output line provided at the edge on the side of the outer periphery of the TE mode resonator in the H plane coupling window, and magnetically coupled the electromagnetic waves.

16. The RF module according to claim 15, wherein the waveguide comprises a pair of ground electrodes provided so as to face each other and a conductor for making the pair of ground electrodes conductive.

17. The RF module according to claim 15, further comprising an input line capable of supplying electromagnetic waves in the TEM mode as electromagnetic waves in the TE mode to the waveguide.

18. The RF module according to claim 17, further comprising at least one resonator between the input line and the half-wavelength TE mode resonator.

19. An RF module comprising:

a waveguide in which a half-wavelength TE mode resonator is formed;

an E plane coupling window formed in a wall portion orthogonal to an H plane out of wall portions constructing the TE mode resonator in the

waveguide;

an H plane coupling window formed in one of wall portions parallel with the H plane of the wall portions;

one output line provided at the edge on the side of a wall portion facing the wall portion in which the H plane coupling window is formed in the E plane coupling window, and magnetically coupled to electromagnetic waves in the TE mode resonator; and

another output line provided at the edge on the center side of the TE mode resonator in the H plane coupling window, and magnetically coupled to the electromagnetic waves.

20. The RF module according to claim 19, wherein the waveguide includes a pair of ground electrodes provided so as to face each other and a conductor for making the pair of ground electrodes conductive.

21. The RF module according to claims 19, further comprising an input line capable of supplying electromagnetic waves in the TEM mode as electromagnetic waves in the TE mode to the waveguide.

22. The RF module according to claim 21, further comprising at least one resonator between the input line and the half-wavelength TE mode resonator.